

Intercomparisons of OMI and MODIS Deep Blue Aerosol Products

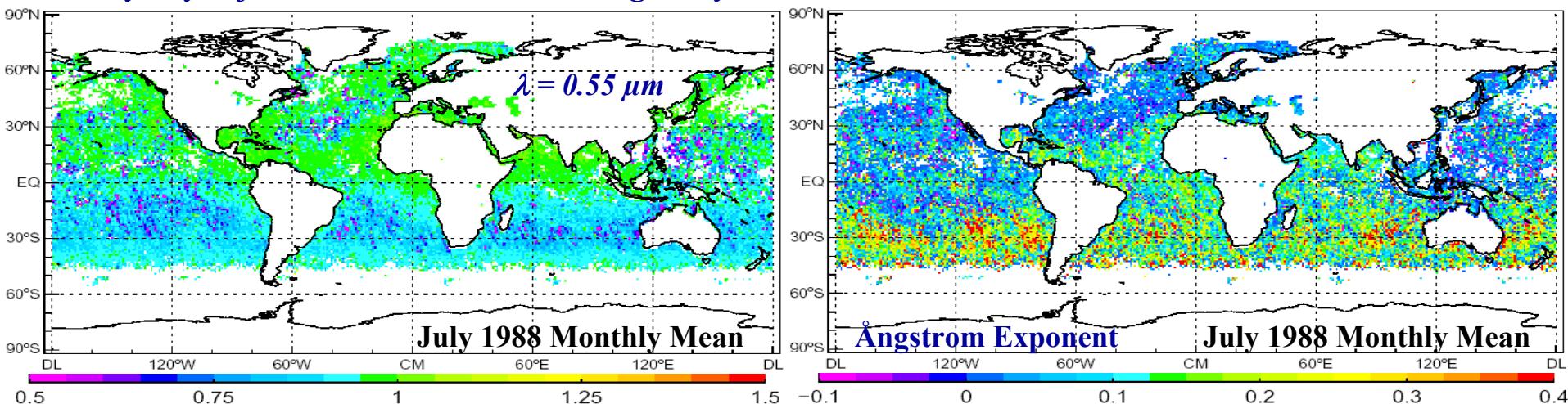
*N. Christina Hsu, M.-J. Jeong, Omar Torres,
and Jay Herman*

*NASA Goddard Space Flight Center &
University of Maryland
Greenbelt, Maryland USA*

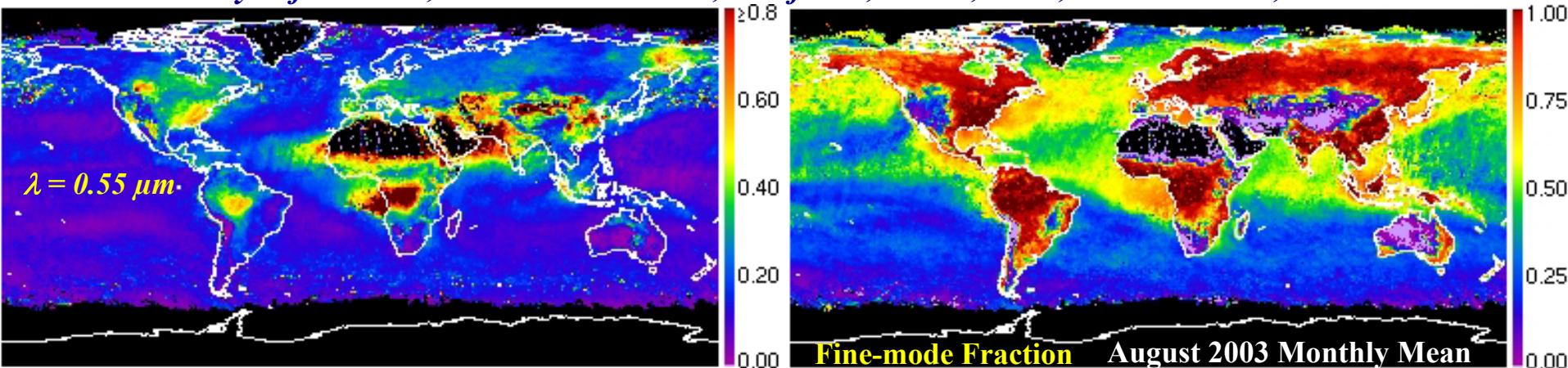


Aerosol Remote Sensing & Retrievals

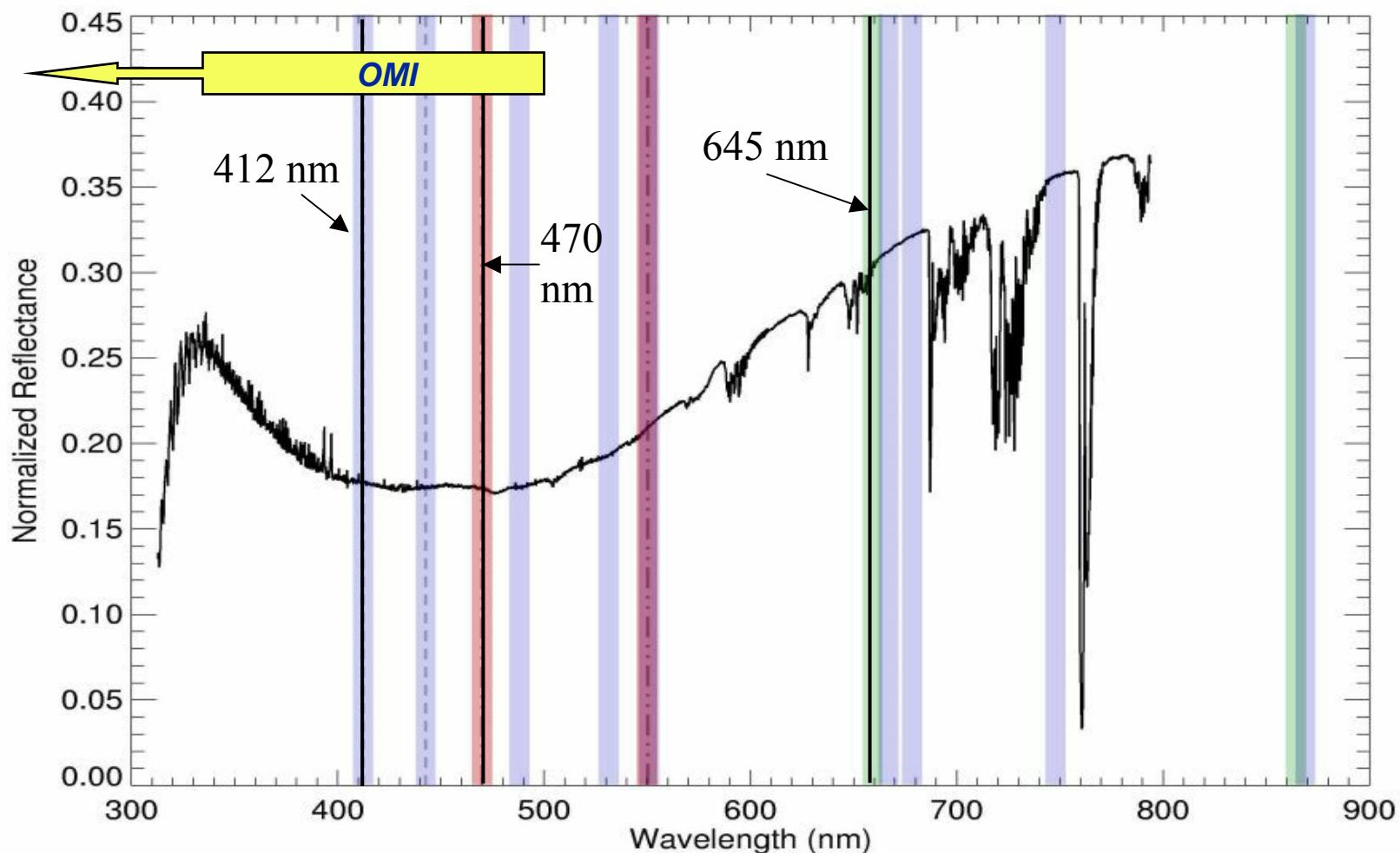
The early days of AVHRR, since 1983: Geogdzhayev, Mishchenko, et al., J. Atmos. Sci., 2002.



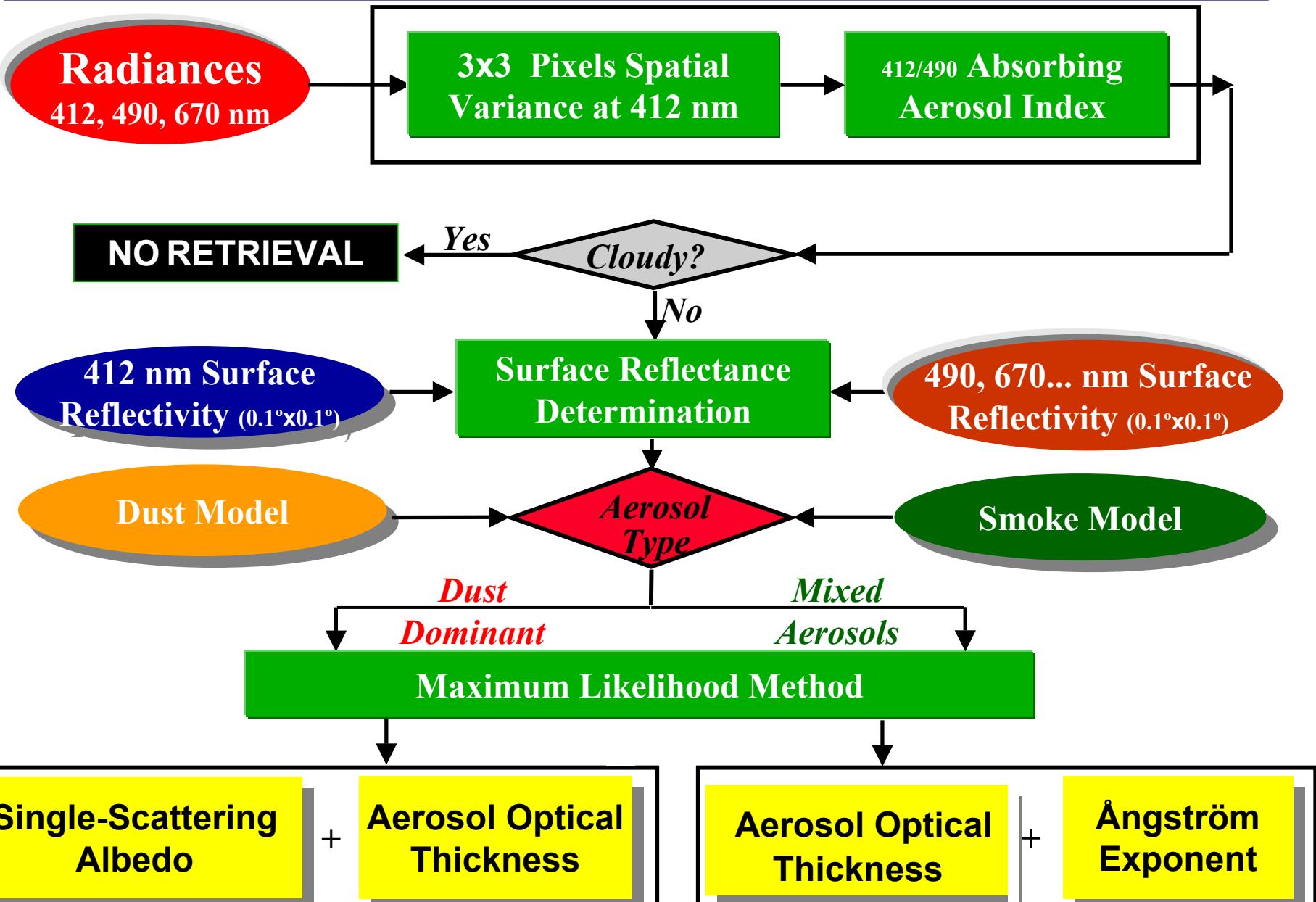
The current days of MODIS, since 2000: Remer, Kaufman, Tanré, et al., J. Atmos. Sci., 2004.



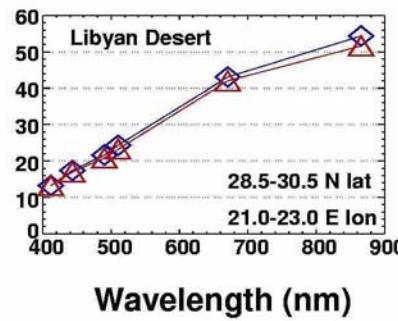
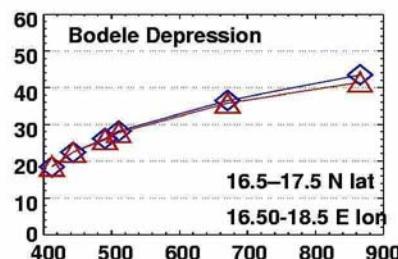
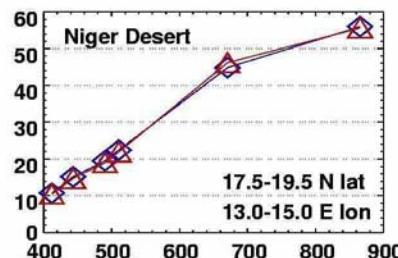
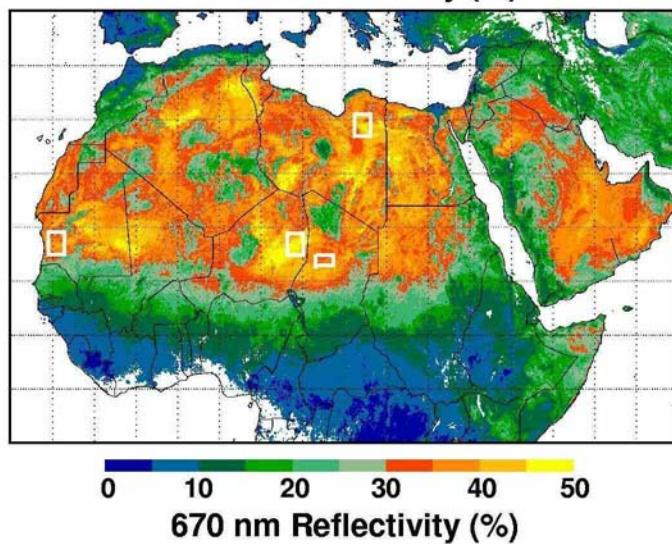
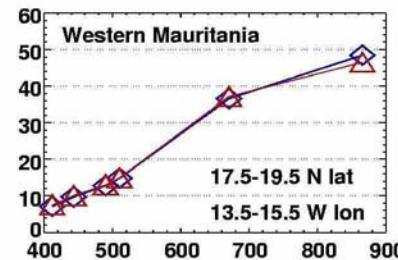
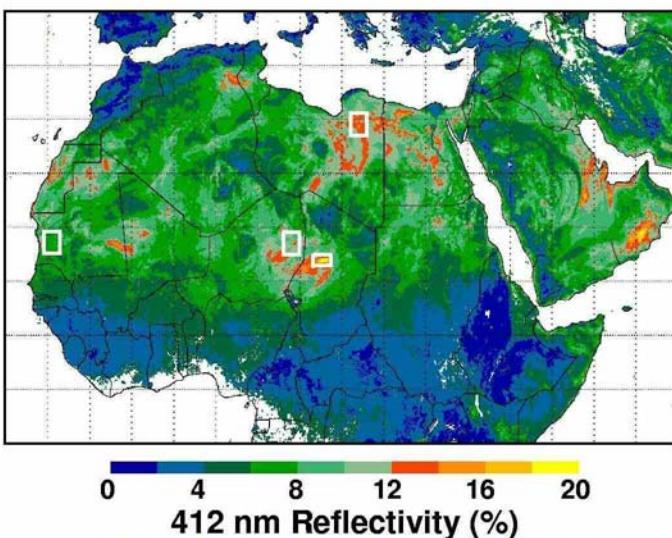
MODIS Visible & NIR Bands: superimposed on the GOME spectral reflectance taken over the Sahara

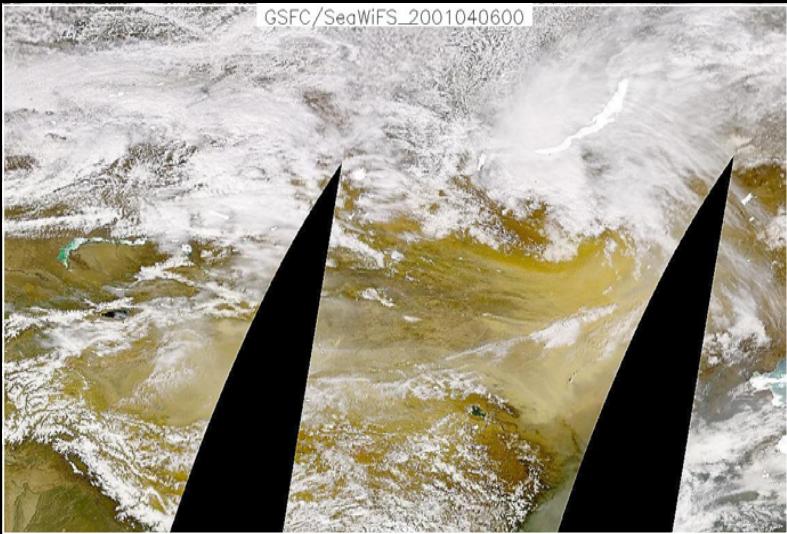


Flowchart for Deep Blue Algorithm

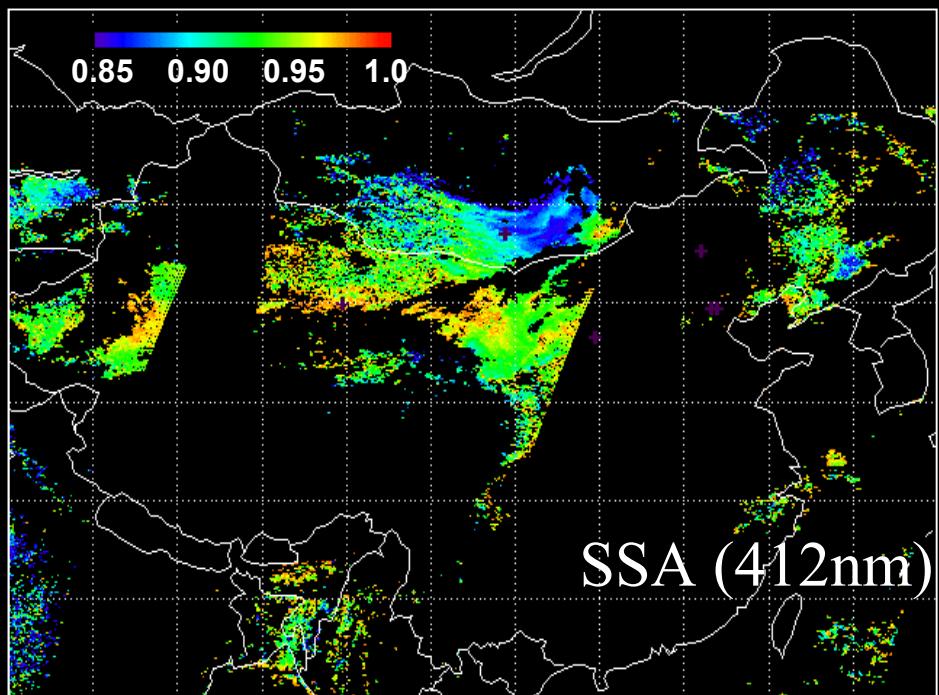
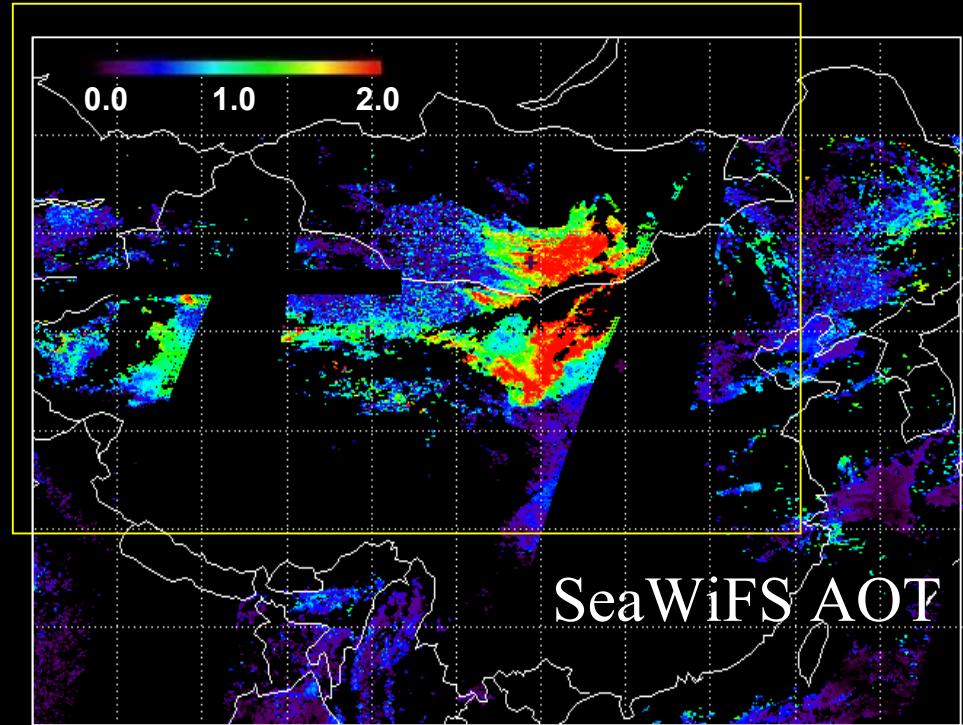


Surface Reflectivity Data Base



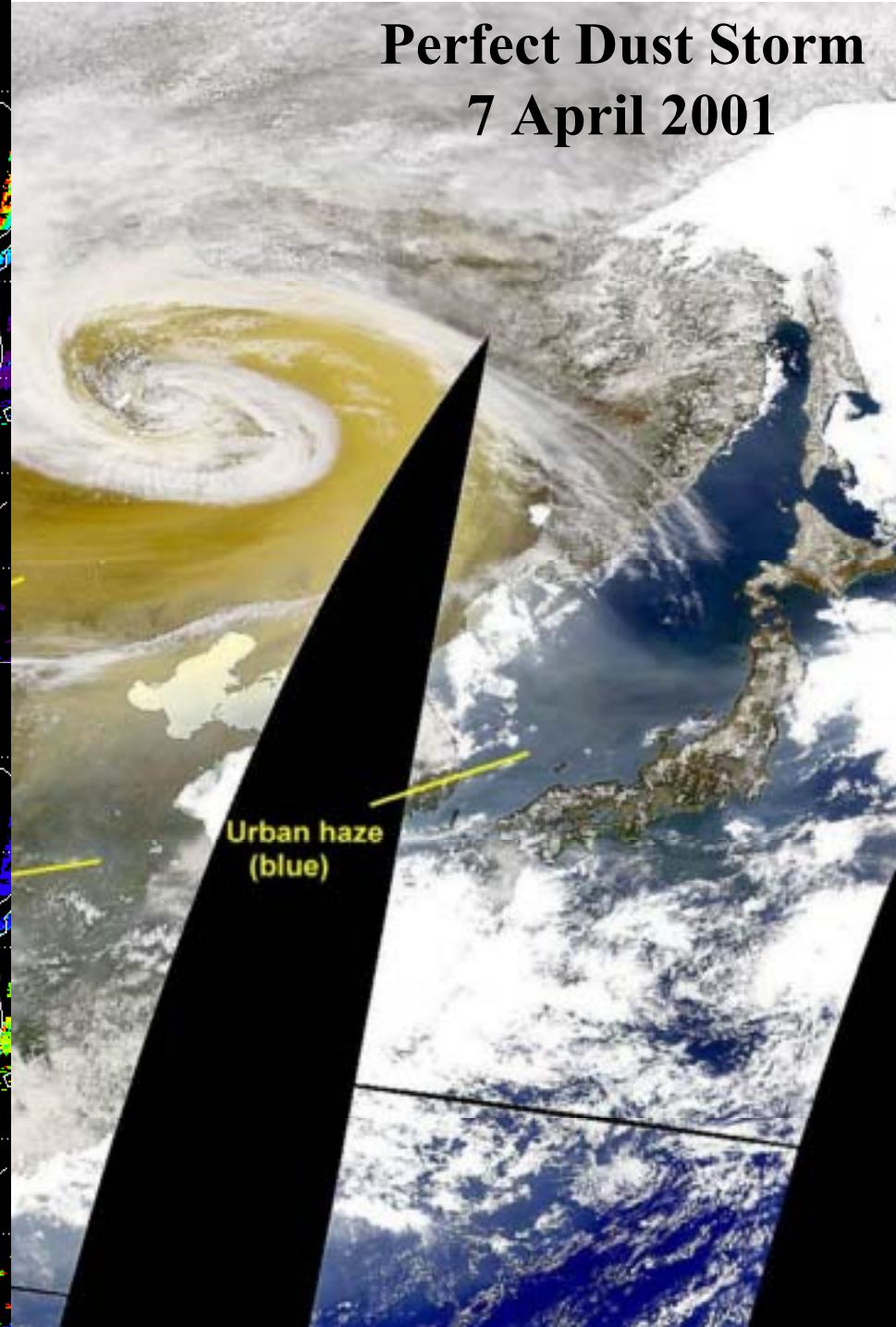
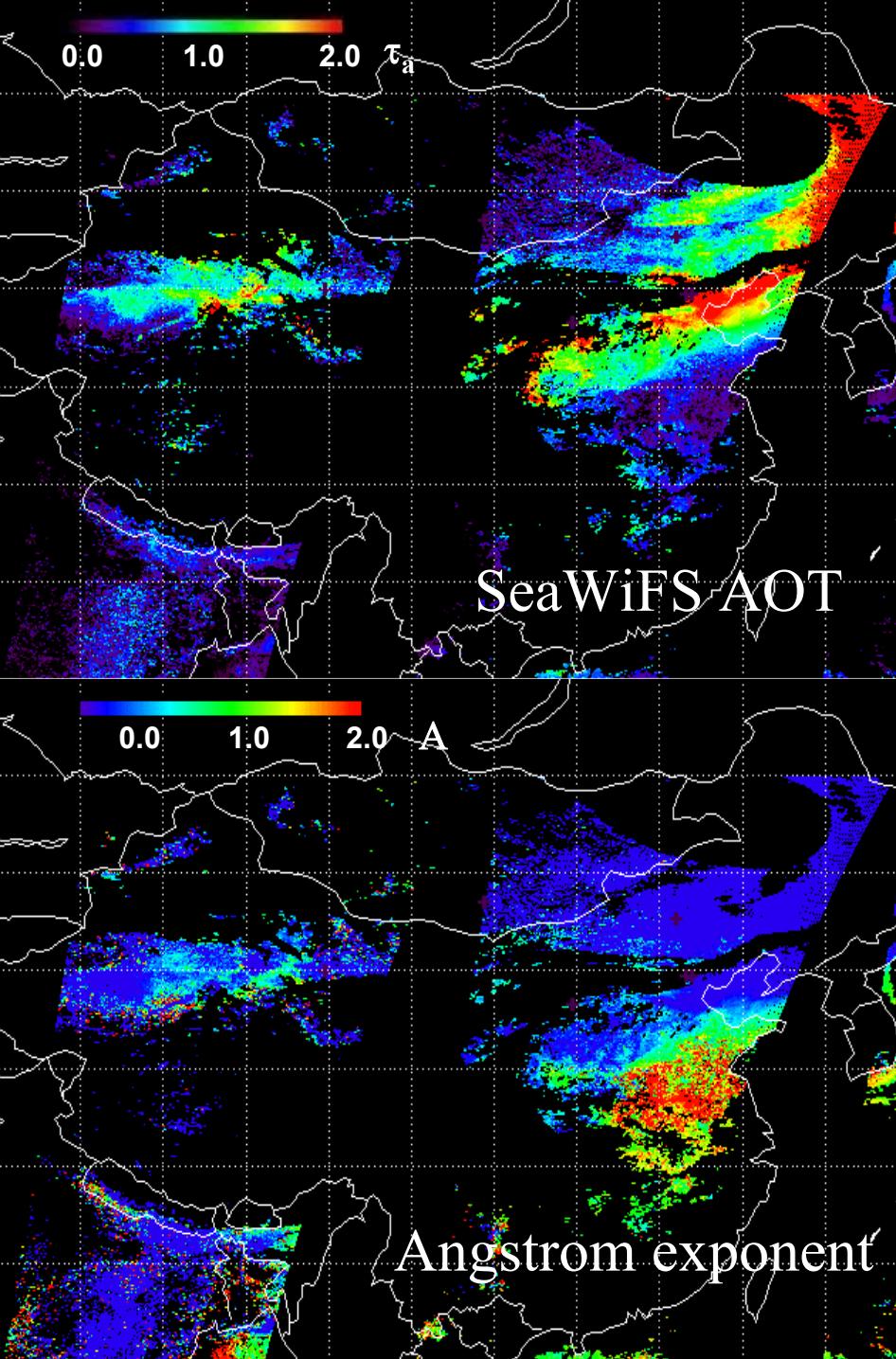


SeaWiFS RGB - Rayleigh
Asian Dust Outbreak
6 April 2001

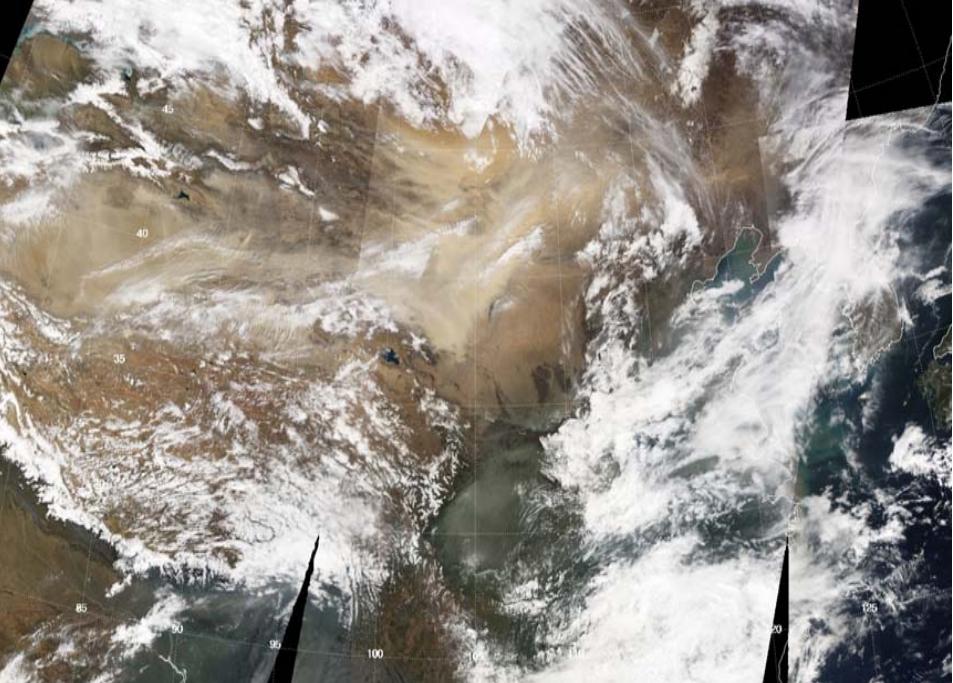


- *Deep Blue Algorithm:*
- *Cloud mask works very well*
- *Aerosol retrievals indicate dust storms originated from Gobi and Inner Mongolia regions*
- *Single scattering albedos are quite different between these two regions*

Perfect Dust Storm 7 April 2001



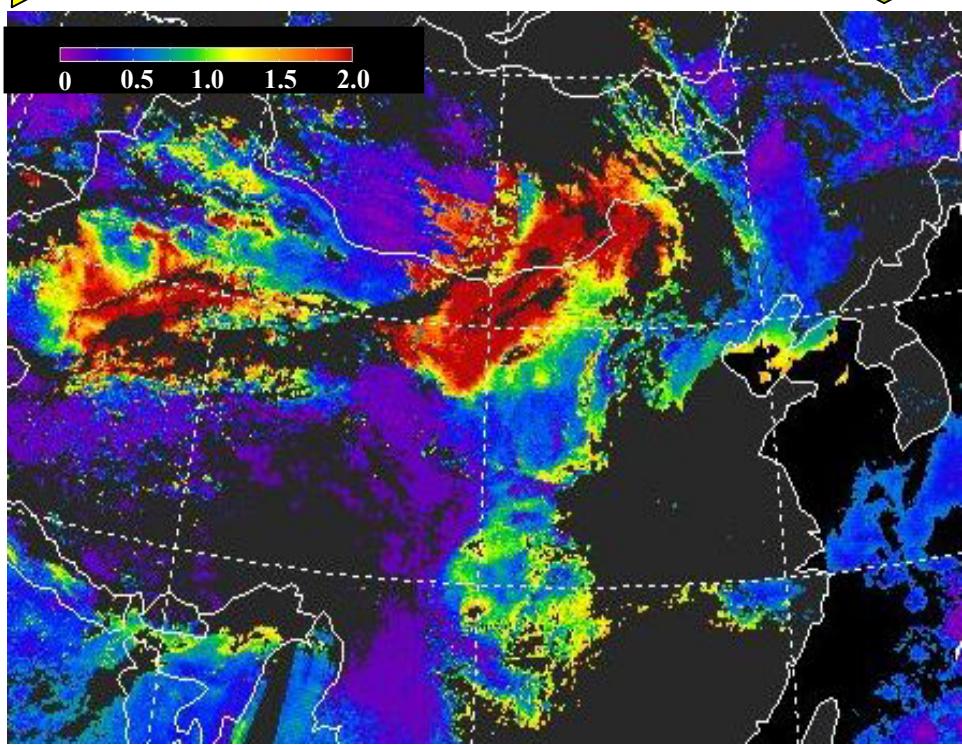
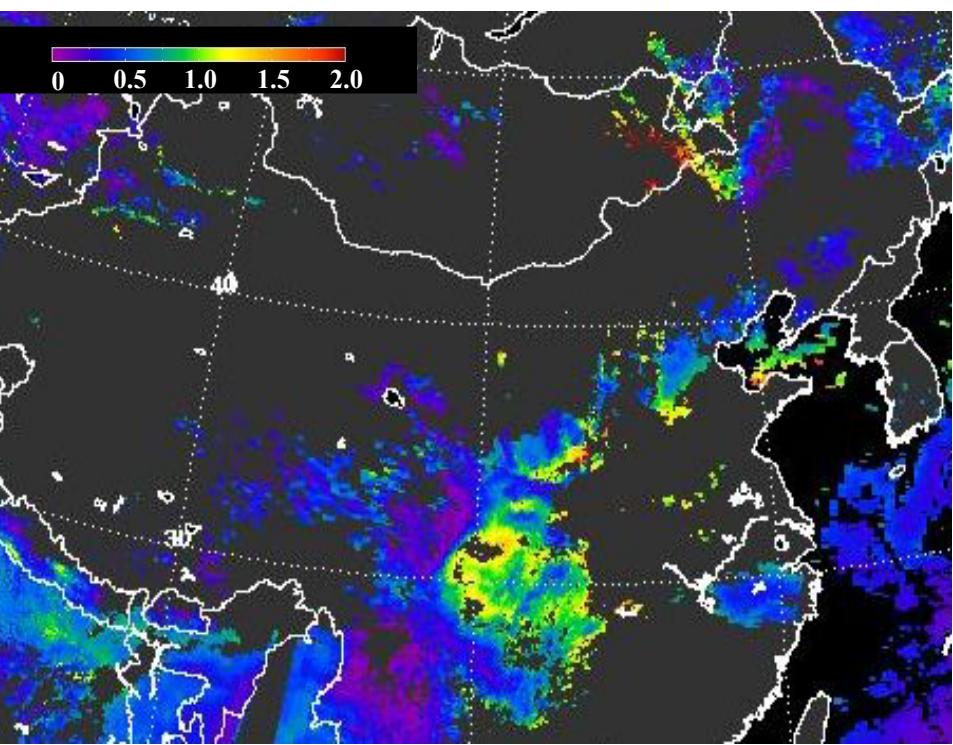
6 April 2001



MODIS *Red-Green-Blue* with
Rayleigh scattering removed

Current MODIS retrievals:
Aerosol Optical Thickness

New MODIS *Deep Blue*:
Aerosol Optical Thickness



Characteristics of OMI and MODIS measurements

1. Temporal Sampling

- Both OMI and MODIS provide global coverage once a day*
- part of A-Train constellation*

2. Spatial sampling

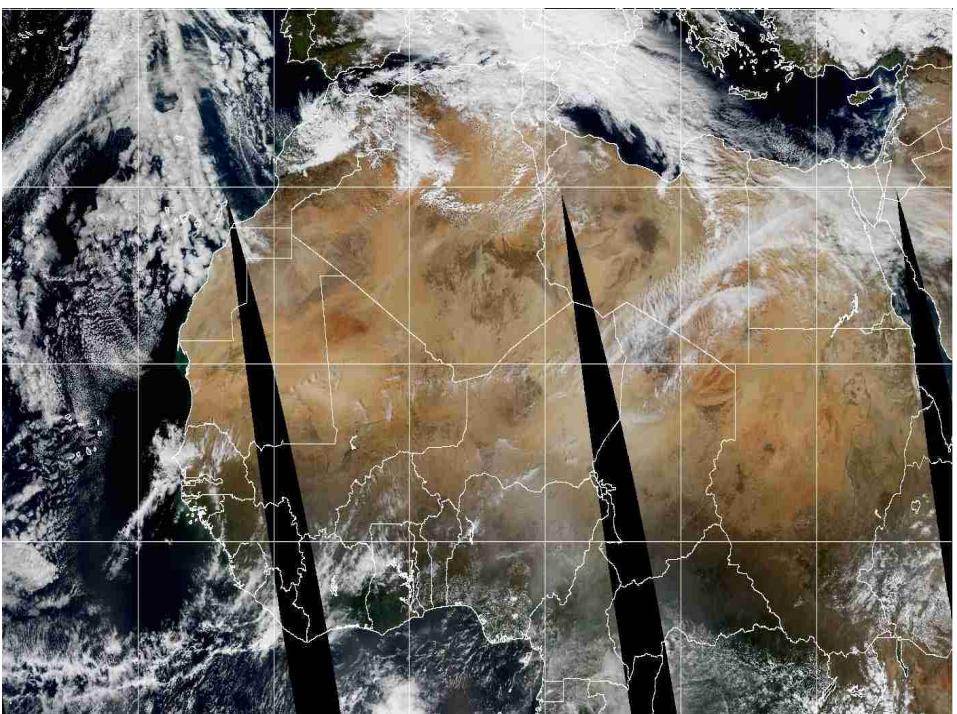
- OMI: 13 x 24 km, MODIS: 1 x 1 km*

Implications on:

- 1. Sub-pixel cloud contamination*
- 2. Spatial resolution of aerosol plumes*

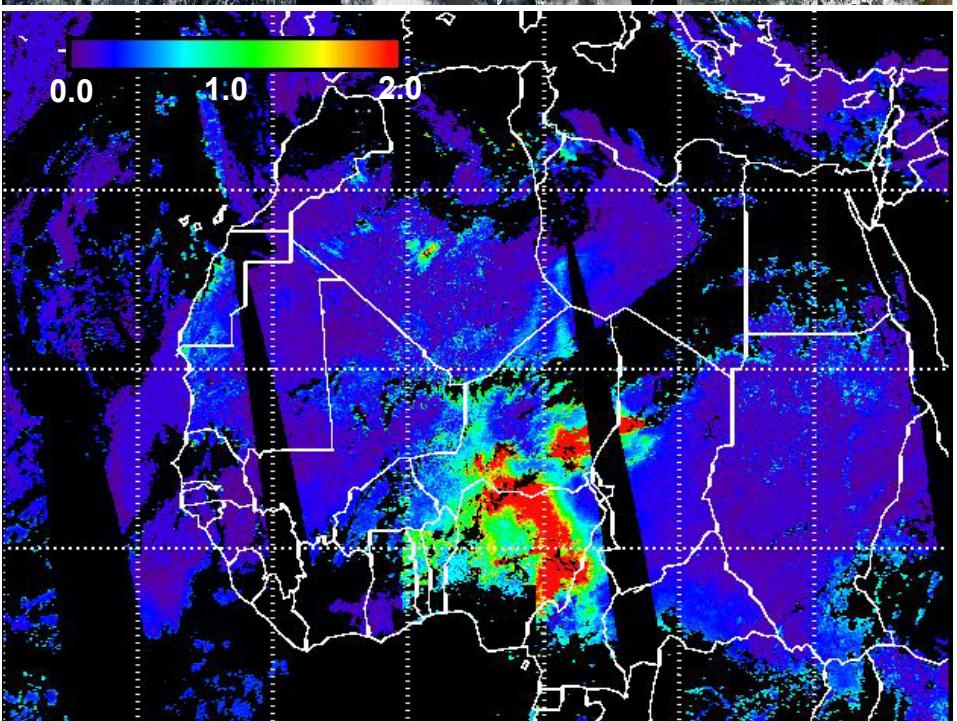


30 January 2006

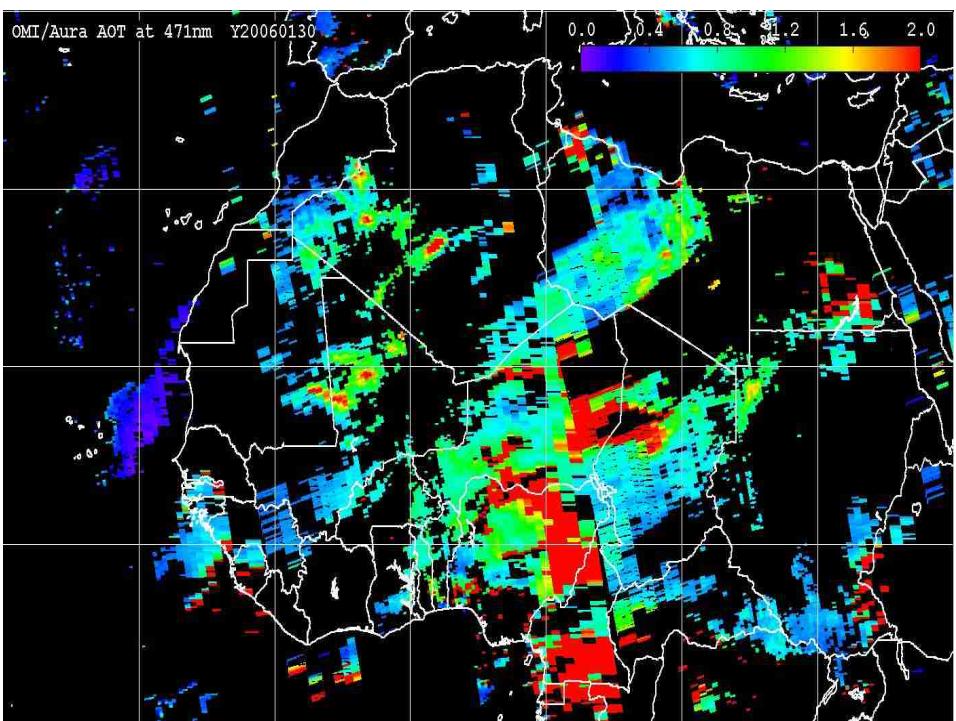


MODIS/ Aqua *RGB* Image

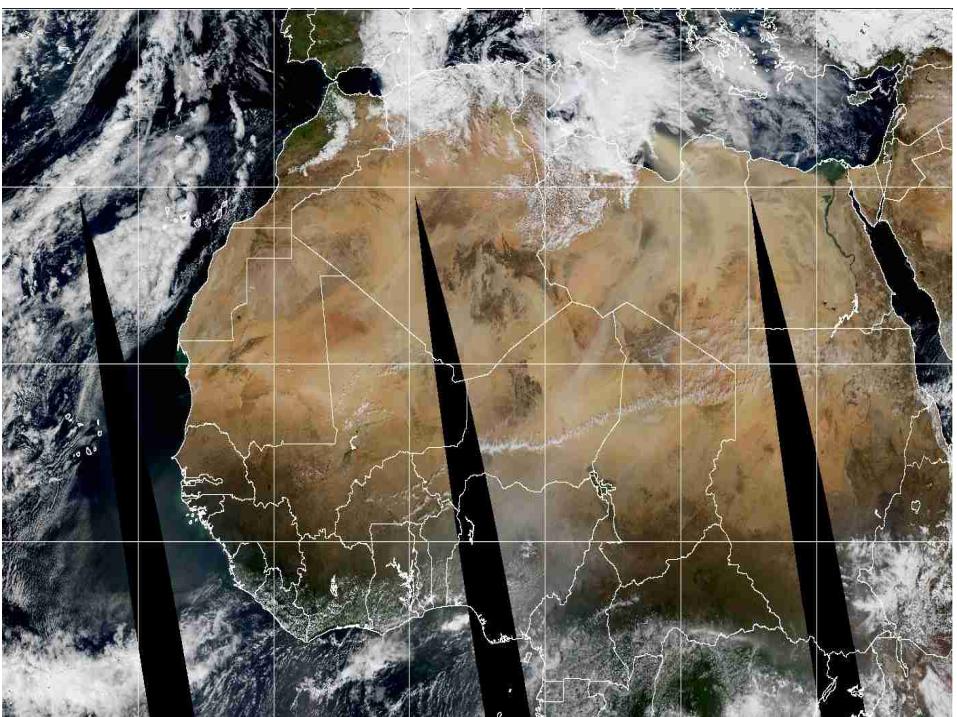
MODIS *Deep Blue: @470nm*
Aerosol Optical Thickness



OMI retrievals: @ 500 nm
Aerosol Optical Thickness

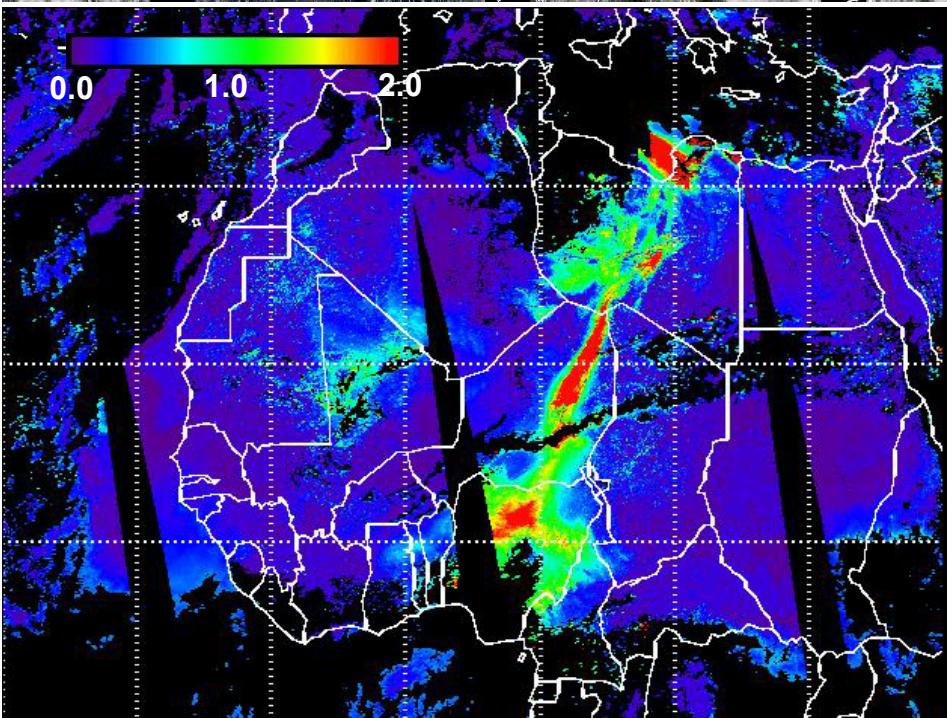


31 January 20

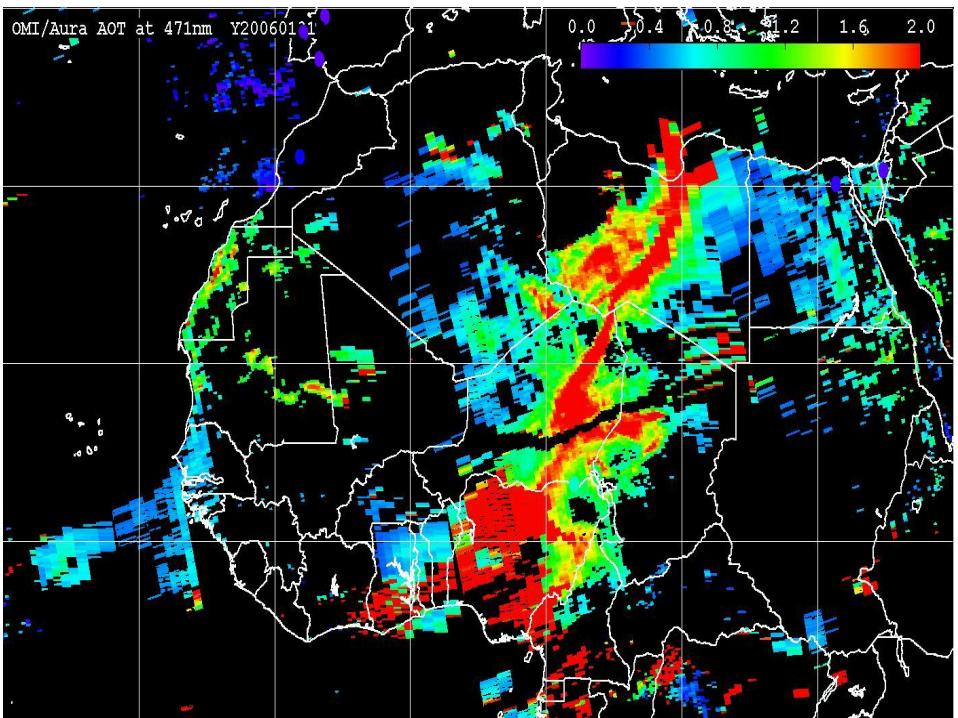


MODIS/ Aqua *RGB* Image

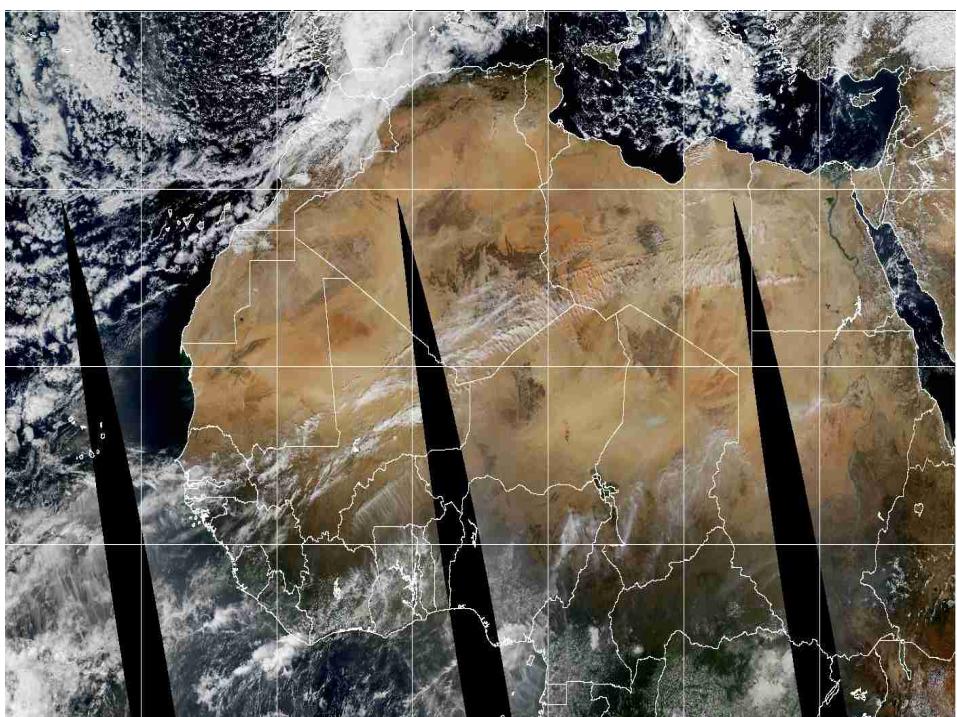
MODIS *Deep Blue: @470nm*
Aerosol Optical Thickness



OMI retrievals: @ 500 nm
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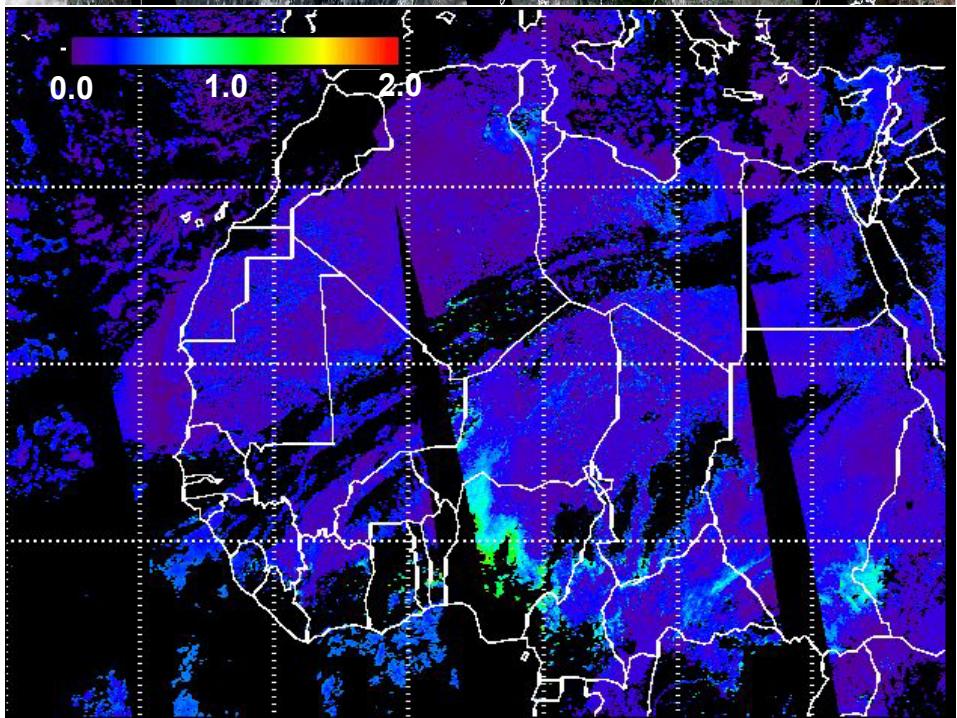


6 January 2006

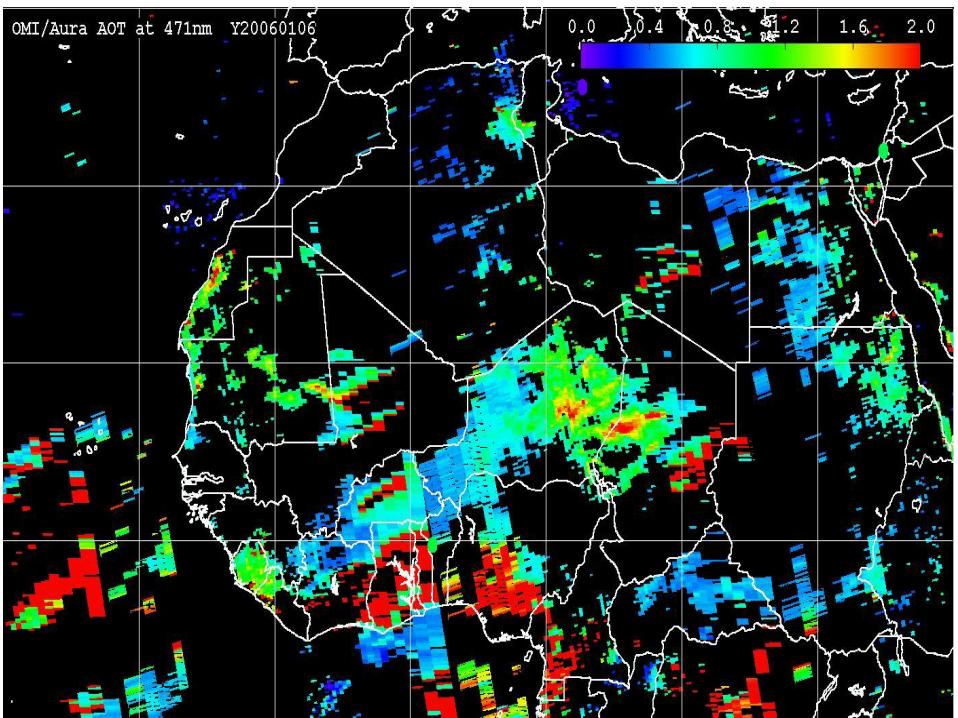


MODIS/ Aqua *RGB* Image

MODIS *Deep Blue: @470nm*
Aerosol Optical Thickness

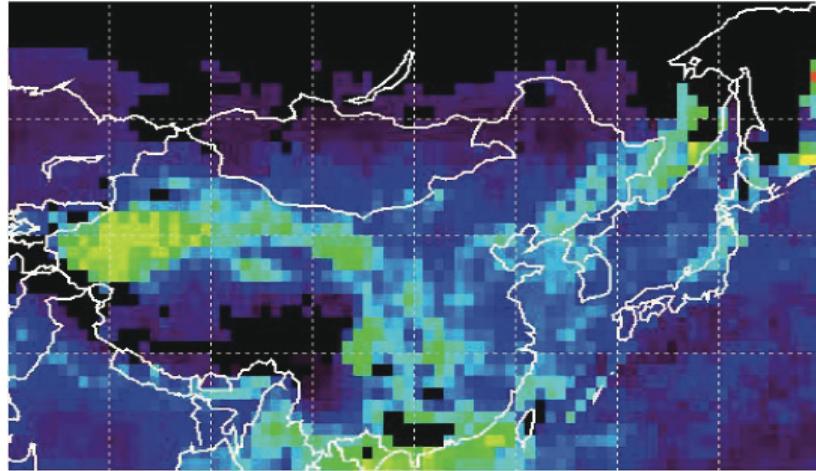


OMI retrievals: @ 500 nm
Aerosol Optical Thickness

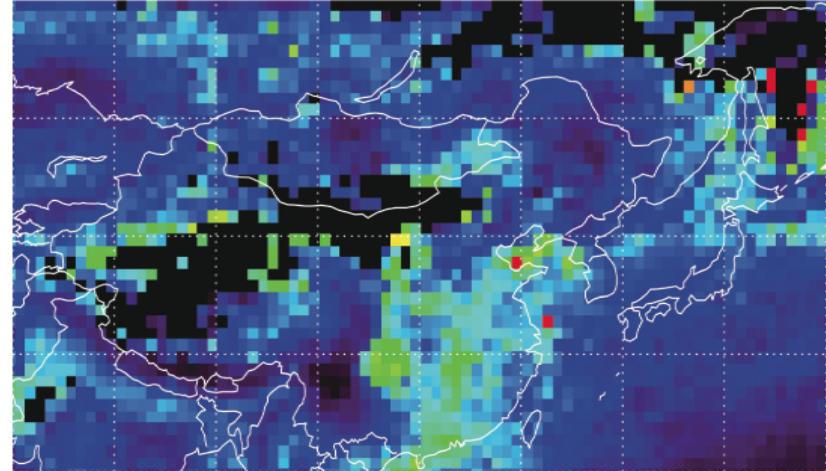


Intercomparisons of Aerosol Products From MODIS, SeaWiFS, and MISR

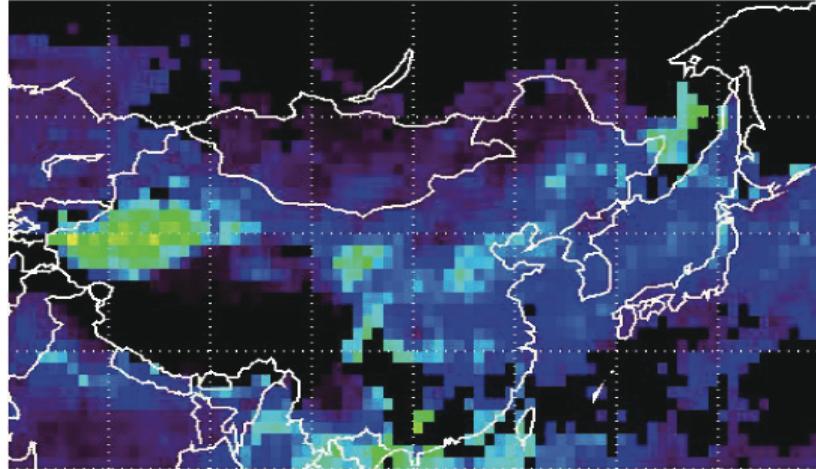
a) MODIS (Deep Blue Retrieval)



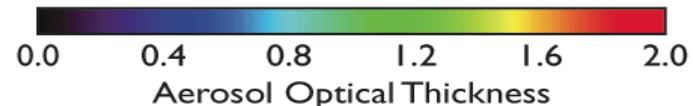
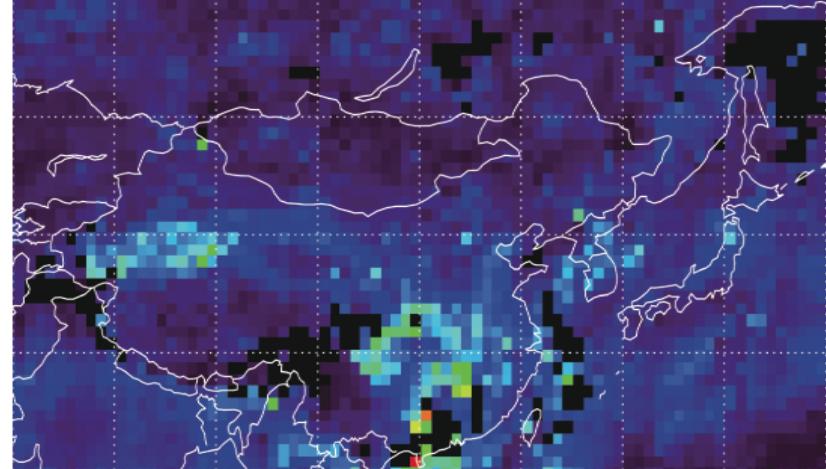
b) MODIS (Operational Collection 4)



c) SeaWiFS (Deep Blue Retrieval)



d) MISR (Operational)



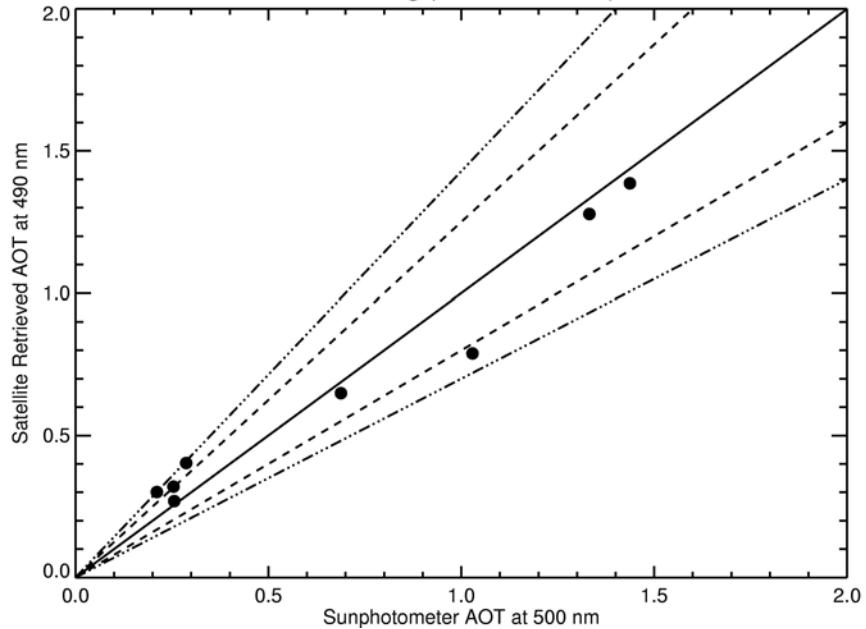
Summary

- *Preliminary results show*
 - Qualitative pattern of aerosol distributions are similar between *OMI* and *MODIS Deep Blue* products;
 - The aerosol optical thickness values are comparable between *OMI* and *MODIS* for moderate AOT, while *MODIS* AOT are significantly lower than *OMI* for low AOT;
 - Cloud contamination in thick smoke clouds could still be improved.
- *We plan to*
 - Continue to intercompare *OMI* and *MODIS Deep Blue* AOT on the global basis;
 - Extend the intercomparisons into single scattering albedo values.

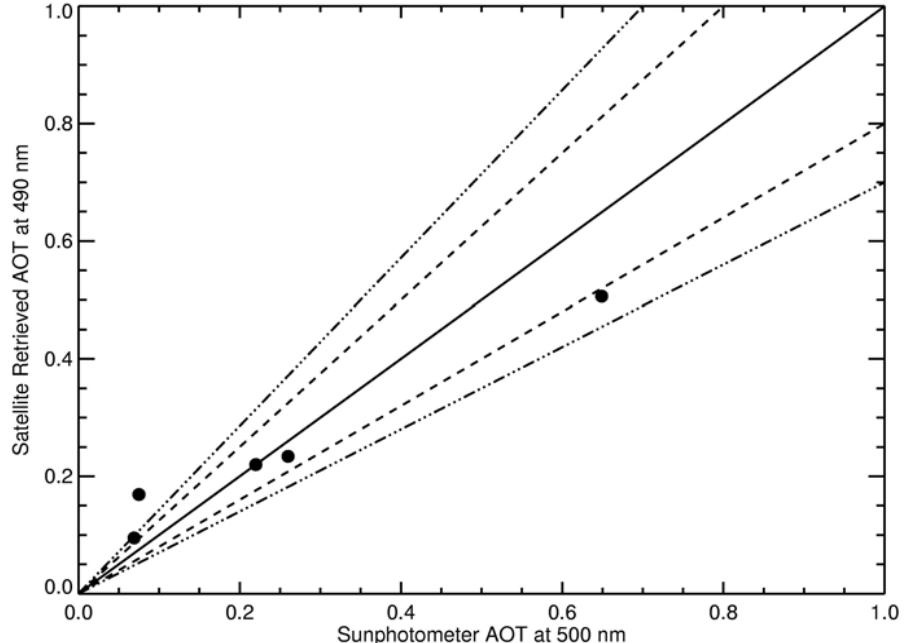


Comparisons with AOT from Sun Photometers in China during ACE-Asia

Satellite Retrieved AOT vs. Sunphotomer Measurements
Dunhuang (40.04N, 94.79E)



Satellite Retrieved AOT vs. Sunphotomer Measurements
Inner_Mongolia (42.68N, 115.95E)



Satellite Retrieved AOT vs. Sunphotomer Measurements
Yulin (38.28N, 109.72E)

